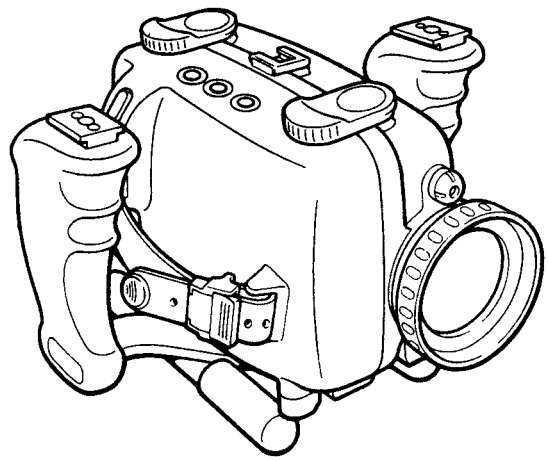
MPK-TRH/TRS

SERVICE MANUAL

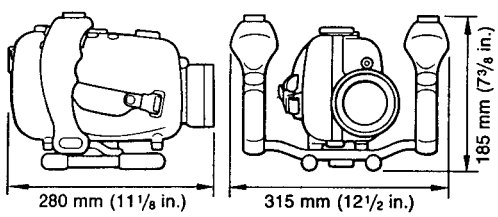
AEP Model
MPK-TRH
US Model
Canadian Model
AEP Model
MPK-TRS



Handycam

SPECIFICATIONS

Compatible equipment	
	Video camera recorder CCD-TR81/TR705E, CCD-TR7/TR75E, CCD-TR5/TR55E, CCD-TR4/TR45E
Material	Aluminum alloy, glass
Waterproofing	O-ring, 2 buckles
Usable depth	Up to 75 meters (246 feet)
Underwater microphone	
	Condenser microphone (monaural)
Controllable function	Power on/off, recording start/stop, auto focus on/off, power zooming
Dimensions	Unit: mm (inch)



Weight	Approx. 3.2 kg (7 lb 1 oz) (including wide-conversion lens and grip)
Accessories supplied	
	Pedestal (1)
	Wide-conversion lens (1)
	Batteries (R6/size AA) (2)
	Shoulder strap (1)
	O-ring (1)
	Grease (1)
Recommended accessories	
	Underwater video light HVL-M20
	Maintenance kit ACC-807

Design and specifications are subject to change without notice.

This marine pack allows the 8 mm video camera recorder CCD-TR81/TR705E, CCD-TR7/TR75E, CCD-TR5/TR55E, or CCD-TR4/TR45E to be used underwater.

- **Recording at a depth of 75 meters (246 feet) is possible.**
- **The following operations can be performed underwater.**
  Power on/off
  Auto focusing on/off
  Recording start/stop
  Power zoom
- **Recording is possible in the rain or on the beach by removal of the grip from the marine pack.**

MICROFILM

HANDYCAM MARINE PACK

SONY®

SECTION 1
GENERAL

This section is extracted from instruction manual.

Precautions

On the video camera recorder

Be careful not to expose the equipment to salty air nor to drip sea water on the equipment.
- Avoid opening the marine pack on the sea or at the seaside. Preparations such as installing and checking the equipment should be made in a place with low humidity and no salty air.
- When a video camera recorder and a monitor TV are to be used on the sea or at the seaside for a long period of time, we recommend that they are checked periodically by a Sony service facility.
- If the equipment becomes wet, take it immediately to the nearest Sony service facility for preventive maintenance.

On power source for the video camera recorder

When you use the marine pack, use Sony battery pack NP-77, NP-77H, NP-77HD, NP-66 or NP-55 for the power source of the video camera recorder. You cannot use battery case EBP-77 or EBP-55.

On the marine pack

- If the marine pack is put in the water after being opened and jointed in a place with high temperature and high humidity, moisture condensation may occur, causing the glass to fog up and perhaps damaging the equipment.
- The waterproof integrity of the marine pack is maintained by the O-ring, and the groove and surface where it touches. Be especially careful not to damage or deform that area.
- Before jointing the marine pack, check this area to see that there are no cracks, dust, sand, hair, etc., and that the O-ring is lightly greased.
- Do not leave the marine pack under direct sunlight for a long period of time, otherwise the temperature in the pack may rise and the equipment in the pack may be damaged.
- If you cannot aovid leaving the marine pack under direct sunlight, be sure to cover the pack with a towel or other protection.
- Do not throw the marine pack into the water, lower it gently into the water.

On recording underwater

- Avoid using the side-window type of mask as it may interfere in you seeing the monitor.
- We recommend you to check before diving that the equipment operates correctly and there is no water leakage at a depth of about one meter (3 feet).
- Be sure to follow the safety rules for diving such as diving period, depth, etc.
- Before recording, remove the bubbles from outside of the front glass.
- When you dive with the marine pack with the wide-conversion lens attached and there is air between the front glass and the wide-conversion lens, remove the wide-conversion lens under water and attach it again.

When opening the marine pack

To prevent the video camera recorder from getting wet, take care on the following points.
- Dry the marine pack well.
- Soak up any water between the left and right bodies with a towel.
- Make sure you are dry. Take care that no water drops from your wet suit or dry suit.

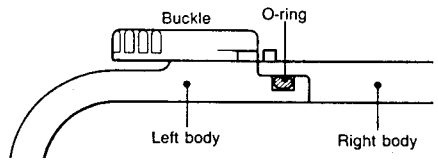
On transportation

- To transport the marine pack, remove the video camera recorder or they may be damaged.
- To transport the marine pack by air or by car, use the marine pack carrying case. It assures safe transportation.

Sony does not accept liability for damage to the video camera recorder, battery, etc. in the marine pack and for the cost of recording if water leakage occurs caused by incorrect operation.

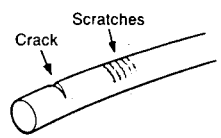
Notes on the O-ring

The O-ring assures the waterproof function of the marine pack. To maintain waterproof integrity, use them correctly. Incorrect operation may cause water to leak in.



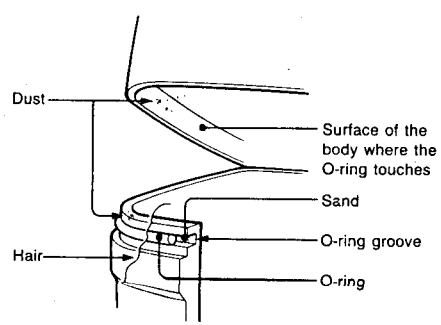
Check that there are no scratches or cracks.

Scratches or cracks on the O-ring may cause water to leak in. If there are any, replace the damaged O-ring with a new one.
Do not remove the O-ring from the groove with a metal tool or a tool with a sharp point.



Remove any dust, sand or hair from the O-ring.

Check there is no dust, sand or hair on the O-ring, or in the groove or on the surface where it touches. If there is, remove them completely, or the O-ring and the surface of the marine pack body may be damaged and water may leak in.



Grease the O-ring.

The grease protects the O-ring from wear.
After checking that there are no cracks or dust on the O-ring, grease them using a finger. During greasing, recheck that there are no cracks or dust.
Never use cloth or paper for greasing because the fibers may cling.
Do not use any type of grease other than supplied one, or it may damage the O-ring.

Do not twist the O-ring.

Put the O-ring in the grooves evenly. Never twist them.

Do not trap the O-ring with the marine pack.

When jointing the marine pack, be careful not to trap the O-ring between the left and right bodies. If this happens, not only will the O-ring be damaged, but also water may leak in.

Storage

Store the supplied spare O-ring in a cool place, packed in the original carton. Be sure to avoid the following:
- Exposing to direct sunlight.
- Placing a heavy object on the O-ring.
- Folding the O-ring.

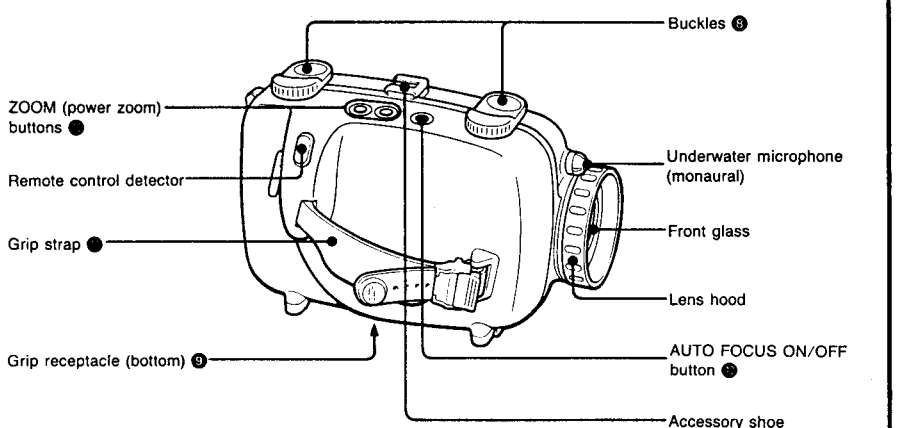
Useful life of the O-ring.

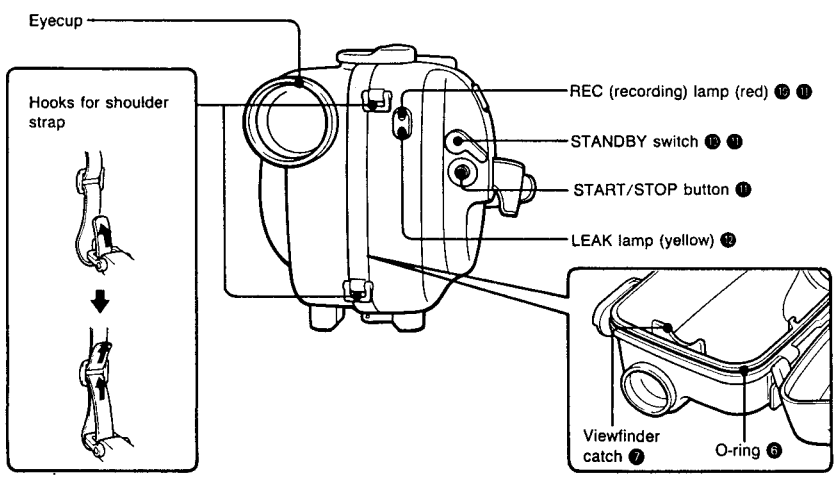
It depends upon the maintenance and the length of use, but we recommend changing it every one or two years. Use the Sony ACC-807 marine pack maintenance kit (not supplied) to replace.

Labeling the Parts and Controls

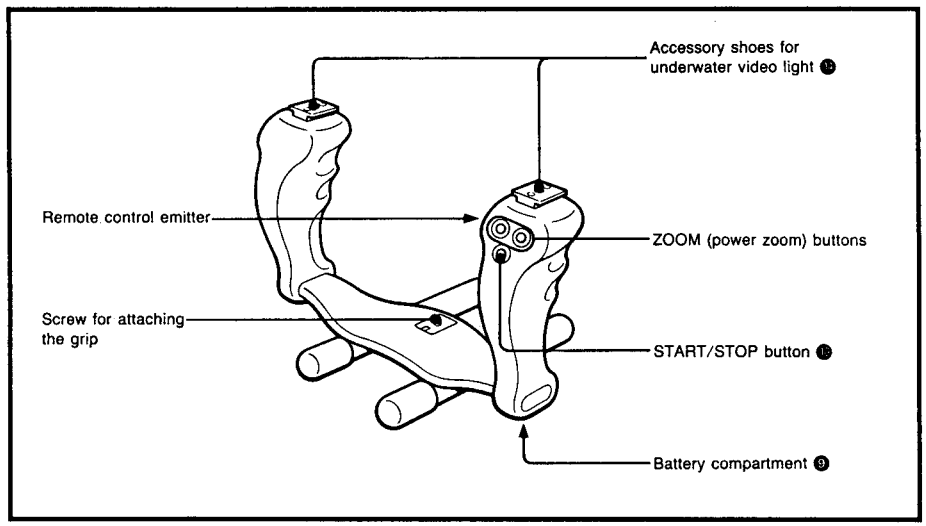
Refer to pages in circles for details.

Body

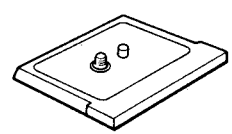
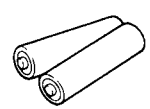
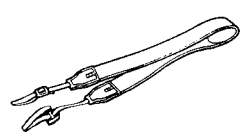
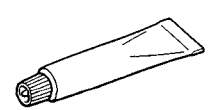




Grip

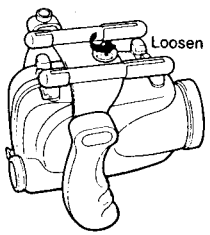

Accessory shoes for underwater video light ⑫
Remote control emitter
ZOOM (power zoom) buttons
Screw for attaching the grip
START/STOP button ⑪
Battery compartment ⑨

Supplied Accessories

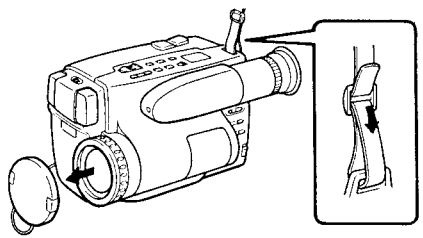
Wide-conversion lens (1)	Pedestal (1) 	Batteries (2) 
Shoulder strap (1) 	O-ring (1)	Grease (1) 

Attaching the Video Camera Recorder to the Marine Pack

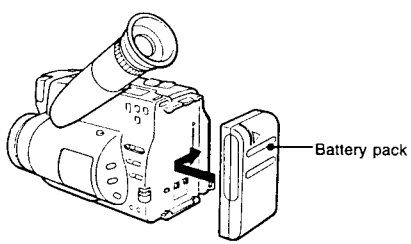
1 Remove the grip from the marine pack.



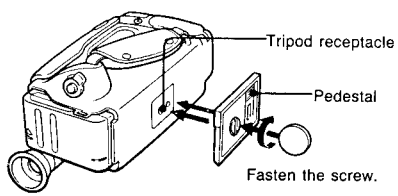
2 Remove the shoulder strap, lens cap or lens filter from the video camera recorder.



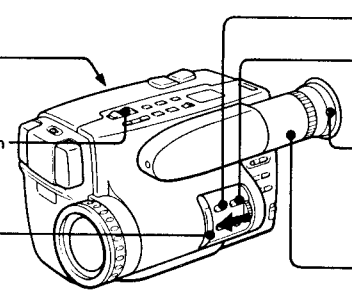
3 After charging the battery pack, attach it to the video camera recorder.



4 Attach the video camera recorder to the pedestal.

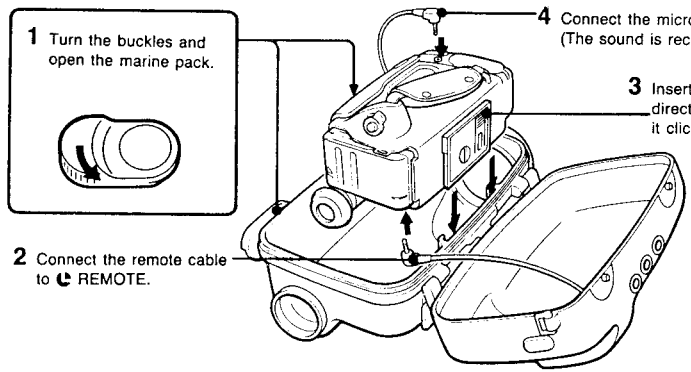


5 Adjust the video camera recorder.

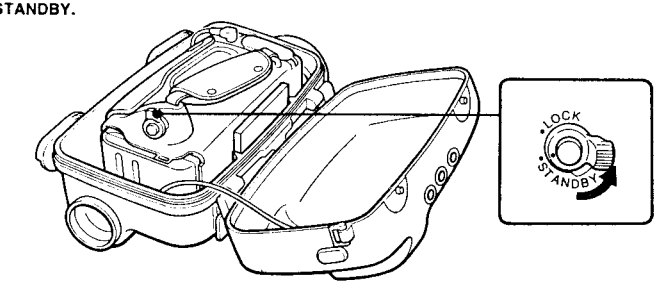

1 Insert the tape.
2 While pressing the green button, set POWER to CAMERA.
3 Set AUTO LOCK to the manual position.
4 Adjust the white balance*.
5 Set the shutter speed to the normal position.
6 Pull the viewfinder out until it clicks and fold the eyecup.
7 Release the click of the viewfinder and set it to the viewfinder catch.

* On adjusting the white balance
Normally set to ☀ (outdoors).
When you dive at night, set to ☼ (indoors).

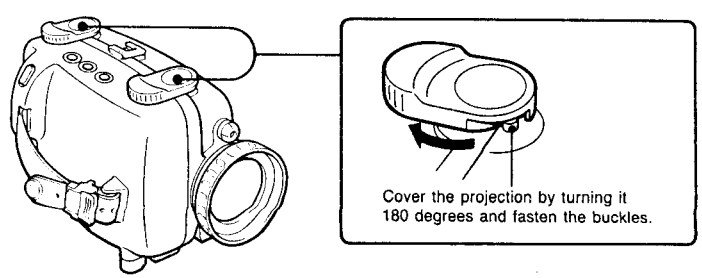
6 Attach the marine pack.


1 Turn the buckles and open the marine pack.
2 Connect the remote cable to REMOTE.
3 Insert the pedestal in the direction of the arrow until it clicks.
4 Connect the microphone cable to MIC. (The sound is recorded in monaural.)

7 Set STANDBY to STANDBY.

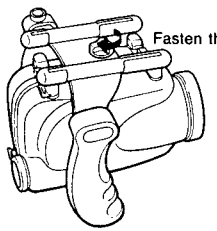


8 Press the left body to the right body and fasten the two buckles securely.

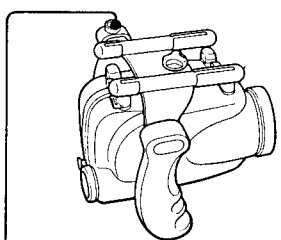


See the "Notes on the O-ring" on page 6.

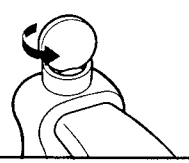
9 Attach the grip.



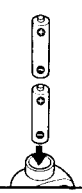
10 Insert the batteries into the grip.



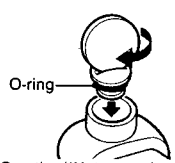
1 Remove the screw.



2 Insert the batteries with the polarity positioned correctly.



3 Tighten the screw.



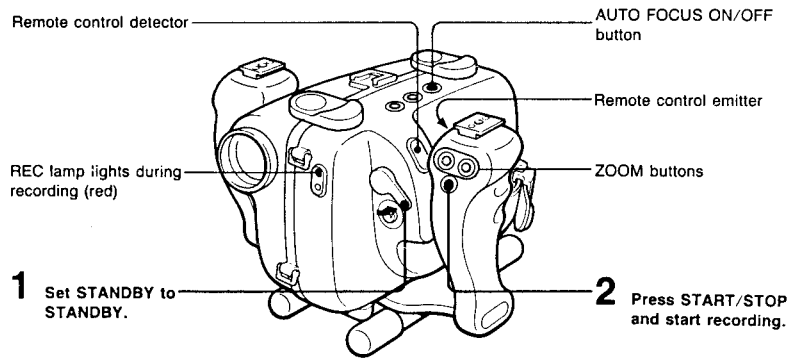
See the "Notes on the O-ring" on page 6.

Battery life

With normal operation, batteries will last for about six months.

Note on batteries
If the marine pack is not to be used for a long period of time, remove the batteries to avoid possible damage from battery leakage.

Recording


Remote control detector
AUTO FOCUS ON/OFF button
Remote control emitter
REC lamp lights during recording (red)
ZOOM buttons
1 Set STANDBY to STANDBY.
2 Press START/STOP and start recording.

Power zooming

Press ZOOM T for telephoto (subject appears closer) and W for wide-angle (subject appears farther away).
You cannot change the zooming speed of the video camera recorder (even if your video camera recorder is adjustable).

For customers using the CCD-TR81/TR705E
Note
When you press ZOOM W until the indicator inside the viewfinder stops at the W side (macro), if there are specks or bubbles in focus on the front glass of the marine pack, press ZOOM T and then ZOOM W again.

To keep in focus

After you get a focused pictures, press AUTO FOCUS ON/OFF and set the camcorder to the manual focus condition.
If fish swim between the camcorder and the subject, you can keep in focus.

To stop recording

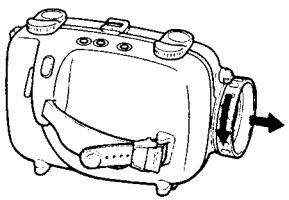
Press START/STOP.

Note on recording

Do not cover the remote control emitter or detector with your finger because the remote control signal for operations is transmitted from the grip to the marine pack.

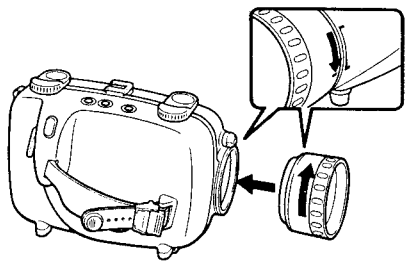
Attaching the wide-conversion lens (supplied)

1 **Remove the lens hood.**

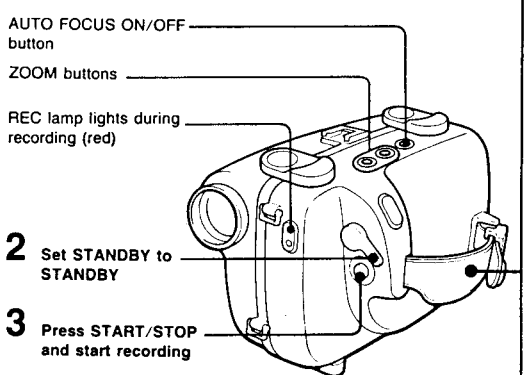


You can attach the wide-conversion lens underwater.

2 **Attach the wide-conversion lens. Turn the lens until it clicks (marked position).**

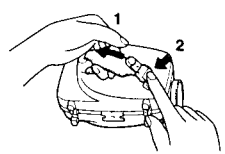


Recording without grip

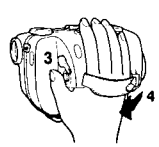

AUTO FOCUS ON/OFF button
ZOOM buttons
REC lamp lights during recording (red)
2 Set STANDBY to STANDBY
3 Press START/STOP and start recording

1 **Adjust the grip strap.**

1 While pulling the grip strap
2 Push the portion shown by the arrow to unfasten the stopper and loosen the strap.

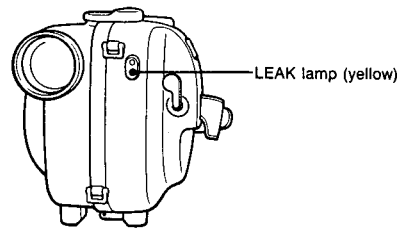


3 Hold the marine pack so that your thumb can easily touch the START/STOP button and your forefinger and middle finger touch the power zoom button.
4 Pull to adjust the length of the strap.



When the LEAK Lamp Blinks

If water happens to leak in, the LEAK lamp (yellow) blinks.



In such a case, remove the marine pack from the water as soon as possible, keeping it horizontal.
Be sure to surface following the safety rules for diving.
After drying with a soft cloth, open the marine pack.
To switch off the lamp, disconnect the remote control cord. Check the cause of the leakage.

If the video camera recorder is wet, take it to the nearest Sony service facility immediately.

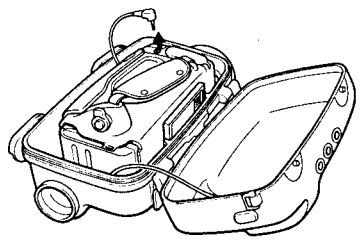
Removing the Video Camera Recorder

Before unfastening the buckles, wash the marine pack with fresh water and dry it with a soft cloth. (See the "When opening the marine pack" on page 5 and "Maintenance" on page 14.)

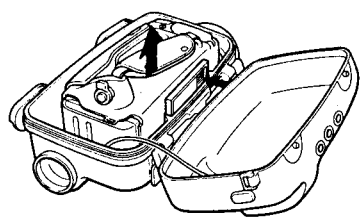
1 **Remove the grip.**

2 **Unfasten the buckles and open the marine pack.**

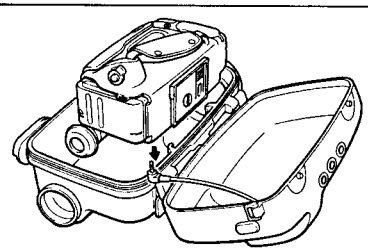
3 **Disconnect the microphone cable.**



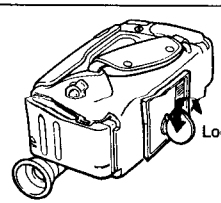
4 **While pressing the portion shown by the arrow, pull the video camera recorder out gently. Take care as the remote cable is connected.**



5 **Disconnect the remote cable.**



6 **Remove the video camera recorder from the pedestal.**



Loosen the screw.

Underwater Recording

Recording underwater is different from recording on land because it is affected by the clarity and depth of the water and the light conditions. The following are hints for good recording underwater.

Color characteristics underwater

Water absorbs light, especially red light, so that objects in deep water are seen as bluish. The color of objects is affected by the clarity of the water.
To record in natural color, use the Sony VF-M90 color filter.

Best time for recording

The best recording time is from 10:00 a.m. to 2:00 p.m. When the sun is high in the sky, optimum results can be obtained.
To record at night, use an additional powerful underwater video light.

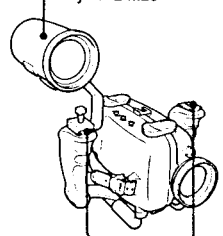
Subject size underwater

Since the refractive index underwater is higher than that in air, an object is visible by 1/4 more closely, and therefore larger. This phenomenon affects the lens on the video camera recorder as well as the human eye. Using a lens with a wide angle of field is effective underwater. This is why a wide-conversion lens is recommended.

Underwater video light

In a deep place or under rocks where direct sunlight does not reach, recording with the underwater video light is recommended.

Underwater video light
such as Sony HVL-M20



Attachable to the
left or right shoe

Camera work in slow and stable motion

When recording, keep your body stable.
An unstable shot will be magnified on the TV screen.
Move the video camera recorder as slowly as possible.
As most of the object underwater move, you can record a good program without moving the recorder.

Maintenance

After recording

After recording in the sea, submerge the marine pack with the buckles fastened thoroughly in fresh water for a while to remove the sea water. Then wash it with fresh water and dry it with a soft cloth. Clean the video camera recorder and the inside of the pack with a dry soft cloth. Do not use any type of solvent, such as alcohol or benzine for cleaning, as this might damage the finish. Be sure to perform the above procedure every time the marine pack is used in the sea.
If the sea water remains on the marine pack, the metal parts may get rusty or the operation lever becomes hard to move.

When storing the marine pack

Grease the O-ring, put them in the groove correctly. Close the pack without fastening the buckles and place it in a cool place.
Avoid storing the marine pack in a hot or very cold place, in a place subject to direct sunlight or excessive dust, or together with naphthalene or camphor. This will damage the marine pack.

1.Concerning Defects

Marine Pack defects are classified as the three following types.

1) Operational defects

This type mainly involves malfunctions caused by electrical circuit or parts defects. Repair is the same as for normal products.

2) Damaged and missing parts

Waterproofing is sometimes affected by the locations of defects and symptoms. Before making repairs, always use the check list to check the type of defect.

Note : Refer to pages 10 and 11 for the check list.

3) Water leaks

After the discovery of a defect or after making repairs, it is necessary to perform either a hydraulic pressure test or simple water leak test using a water tank.

2. Concerning Water Leaks

To ensure waterproofing, O-rings are used in the holes in the Marine Pack housing for openings, shafts, display windows and the front glass. Water leaks are possible in any of these locations but the conditions under which water leaks occur differ for the openings and the other parts.

1) Water leaks at openings

Openings are waterproofed using O-rings compressed by the force of the buckle spring.

Near the surface of the water, where little water pressure is applied to Marine Pack, the force of the buckle alone provides sufficient waterproofing. As the water pressure applied to Marine Pack increases at greater depths, however, the force applied to the O-rings increases due to the water pressure to increase the waterproofing.

Because of this, due to the type of waterproofing construction used, opening water leaks are more prone to occur in shallow water (approx. 2 meters) than in deep water.

Also, since there is a gap between the front and rear housings, sand and dirt tend to enter and adhere to the O-ring in shallow water. When the cover is opened, this sand and dirt can then enter under the O-ring and cause a water leak the next time Marine Pack is used.

This, most water leaks in the openings are the result of adhered dirt, sand, hair and other foreigh matter as well as O-ring and housing damage due to careless handing.

2) Water leaks at other openings

Parts where there are holes in the housing (shafts, display window, front and rear glass) are constructed with O-rings mechanically compressed by screws and nuts.

Due to the construction, these places cannot be reached with the hands : therefore, the waterproofing is more secure than that of the openings.

The causes of water leaks are damage of the parts compressing the O-rings, loosening of the screws and nuts fastening the parts and improper reassembly.

3. Water Leak Check Methods

After the discovery and repair of water leak, it is necessary to perform a hydraulic pressure test and water leak test using a water tank.

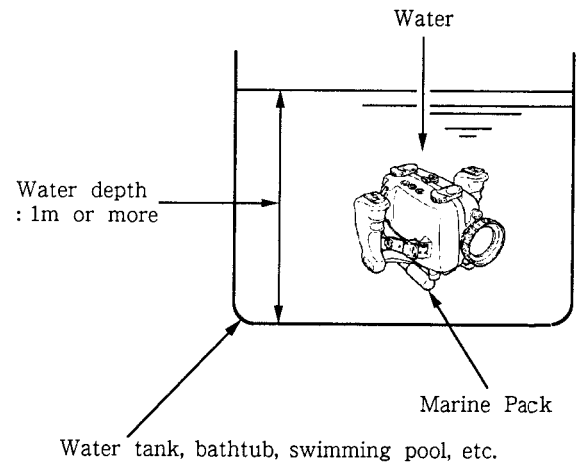
1) Opening water leak check method

As was mentioned above, due to the construction, water leaks in openings are more prone to occur in shallow water than in deep water. Consequently, a simple water leak test using a water tank is sufficient in many cases, without performing a hydraulic pressure test.

***Water leak test**

In this method, Marine Pack immersed in a tank filled with water and checked for water leaks.

Marine Pack should be left immersed in the water tank (or bathtub, swimming pool, etc.) for at least 15-20 minutes with the covers closed. The water depth should be at least 1 meter.



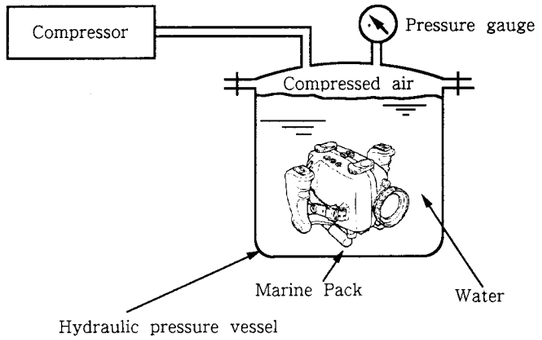
2) Water leak check methods for other waterproofed locations.

In addition to water leaks caused by damaged parts and loose screws, there are also water leaks at other waterproofed locations which cannot be detected with a water leak test : therefore, the hydraulic pressure test must be used.

****Hydraulic pressure test**

In this test, Marine Pack is immersed in a water tank called a hydraulic pressure vessel, pressure is applied using compressed air and checks are made for water leaks and the ability to withstand water pressure is tested.

Extreme pressure is applied to Marine Pack underwater. Water leaks may occur when this pressure is first applied. In such cases, the water leak check must be made using the hydraulic pressure test with a hydraulic pressure vessel.



4. Causes of Water Leaks (excluding parts damage)

Water leaks in openings

1) When the covers have been closed with sand, dirt and hair adhered to the O-rings, O-ring grooves, housing O-ring contact surface or waterproof packing.
2) When the cover is closed with an O-ring out of its groove or a cord is caught in the cover.
3) When an O-ring is damaged or cracked (aging).
4) When there is a long scratch which crosses the housing O-ring contact surface.
5) When a cover is not tightly closed due to a defective buckle.

● Water leaks at other waterproofed locations

6) When there are scratches on the surfaces of the parts which compress the O-rings.
7) When the Parts which compress are loose.
8) When tightening with sand, dirt and hair adhered to an O-ring or part which compresses the O-ring.
9) When an O-ring has not been installed.

Causes 1)-5) and 9) above can be discovered relatively easily using the water leak test described above.

5. Water Leak Repair Methods

● Relatively light scratches on O-ring contact surfaces can often by repaired by polishing.

1) Only extermely light scratches can be repaired.
2) Use number 600-1000 waterproof sandpaper for repairs and apply water while polishing.
3) Polish the scratch area smoothly using care not to create local indentations.
4) Do not use putty to make repairs since such repairs will fail under water pressure.

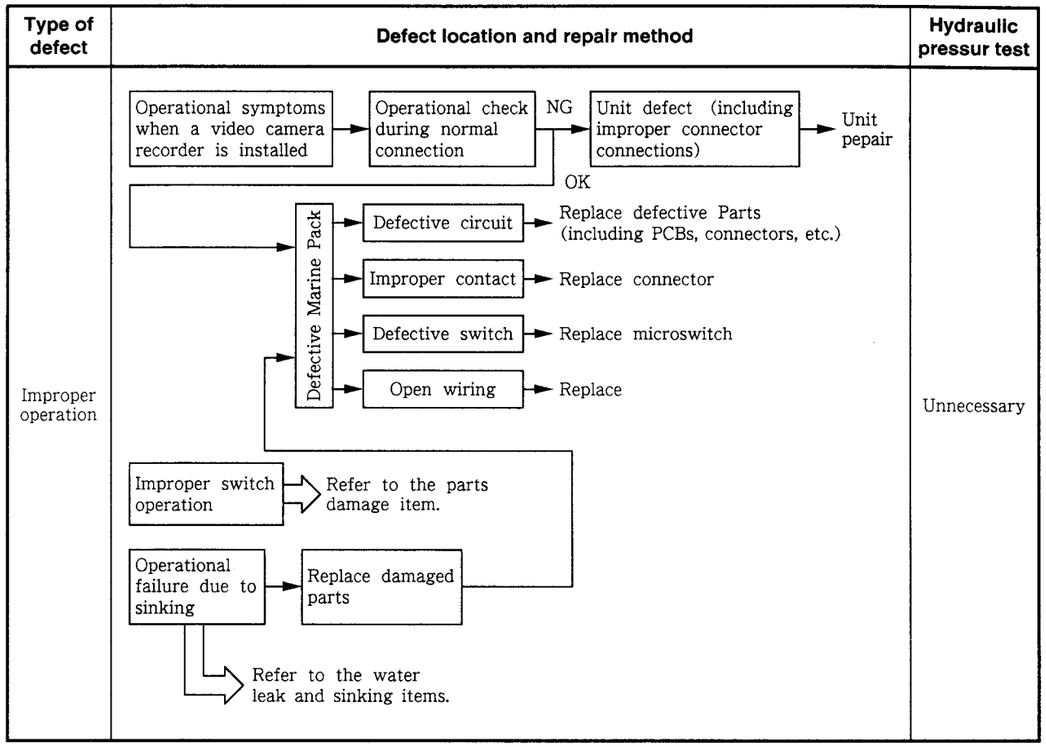
● Checks and cautions

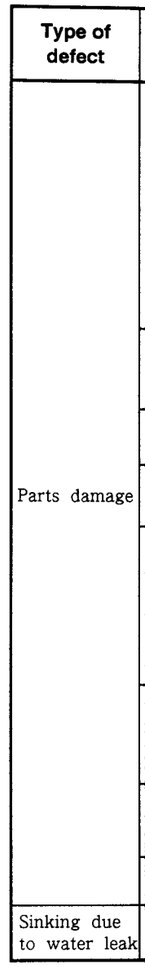
1) Make sure that there are no scratches on the housing O-ring contact surfaces.
2) Make sure that there are no scratches or cracks in the O-rings.
3) Always coat the O-rings with grease by hand and make sure that the O-rings are not twisted when installed.

6. Repair Location and Hydraulic Pressure Test

When a defect is discovered or a repair is made at a location related to the waterproofness of Marine Pack, the hydraulic pressure test must be performed.

Repairs at locations which require the hydraulic pressure test, and the hydraulic pressure test itself, are performed at the factory : therefore, always check the type of defect using the check list before making repairs.





ding parts damage)

with sand, dirt and hair
, housing O-ring contact

ng out of its groove or a

(aging).
osses the housing O-ring

o a defective buckle.
ons
faces of the parts which

se.
air adhered to an O-ring

ed relatively easily using

tact surfaces can often by

epaired.
ndpaper for repairs and

care not to create local

ce such repairs will fail

s on the housing O-ring

cracks in the O-rings.
hand and make sure that
ed.

6. Repair Location and Hydraulic Pressure Test

When a defect is discovered or a repair is made at a location related to the waterproofness of Marine Pack, the hydraulic pressure test must be performed.
Repairs at locations which require the hydraulic pressure test, and the hydraulic pressure test itself, are performed at the factory : therefore, always check the type of defect using the check list before making repairs.

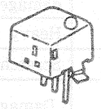
Type of defect	Defect location and repair method	Hydraulic pressur test
Improper operation	Operational symptoms when a video camera recorder is installed → Operational check during normal connection → NG → Unit defect (including improper connector connections) → Unit pepair OK → Defective Marine Pack: Defective circuit → Replace defective Parts (including PCBs, connectors, etc.) Improper contact → Replace connector Defective switch → Replace microswitch Open wiring → Replace Improper switch operation → Refer to the parts damage item. Operational failure due to sinking → Replace damaged parts Refer to the water leak and sinking items.	Unnecessary

Type of defect	Defect location/symptom			Repair method	Hydraulic pressure test
Parts damage	Housing related	Exterior part	Scratch	Replace part	Necessary
		Wateaproofing O-ring	Light damage damage	Polish using waterproof sandpaper	Necessary
			Heavy damage	Replace part	
		O-ring	Scratch, agin	Replace part (life : 2 years)	Unnecessary
		Buckle (including mounting screw)	Damage or coming off	Replace part (repair housing when screws are affected)	Unnecessary
		Underwater microphone	Damage	Replace part	Necessary
	Grip area	Deformation, damage	Light damage	Replace part	Unnecessary
			Heavy damage	Housing repair (overhaul mounting section)	Unnecessary
	Front glass section	Front glass	Damage	Replace part	Necessary
	Rear glass section	Eye cap	Damage, loss	Replace part	
		Rear glass	Damage	Replace part	Necessary
	(Switch related) REC START/STOP switch Power zoom switch STANDBY/LOCK lever AUTO FOCUS ON/OFF switch	Lever	Damage or coming off	Replace part	Necessary
		Switch	Deformation, scratch, damage or coming off	Replace part	Necessary
	Video camera recorder mounting base area	Camera mount	Damage	Replace part	Unnecessary
		Water leakage sensor box.	Damage	Replace part	Unnecessary
	Remote control section	Remote control case	Damage	Replace part	Unnecessary
	An accessory	Wide-conversion lens	Damage, loss	Replace part	Unnecessary
Sinking due to water leak	Determine cause using the hydraulic pressure test.			Repair the defect or replace the part.	Necessary

SECTION 2
PRINTED WIRING BOARDS AND SCHEMATIC DIAGRAM

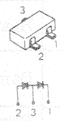
2-1. SEMICONDUCTOR LEAD LAYOUTS

SBX-1619-51

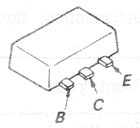


2SC1623
DTC144EK

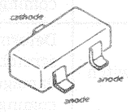
1SS226



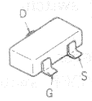
2SD999-CLCK



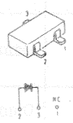
M152WK



2SK620

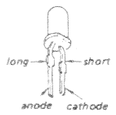


RD5.6M-B2



SLR934A

TLR123
TLY123



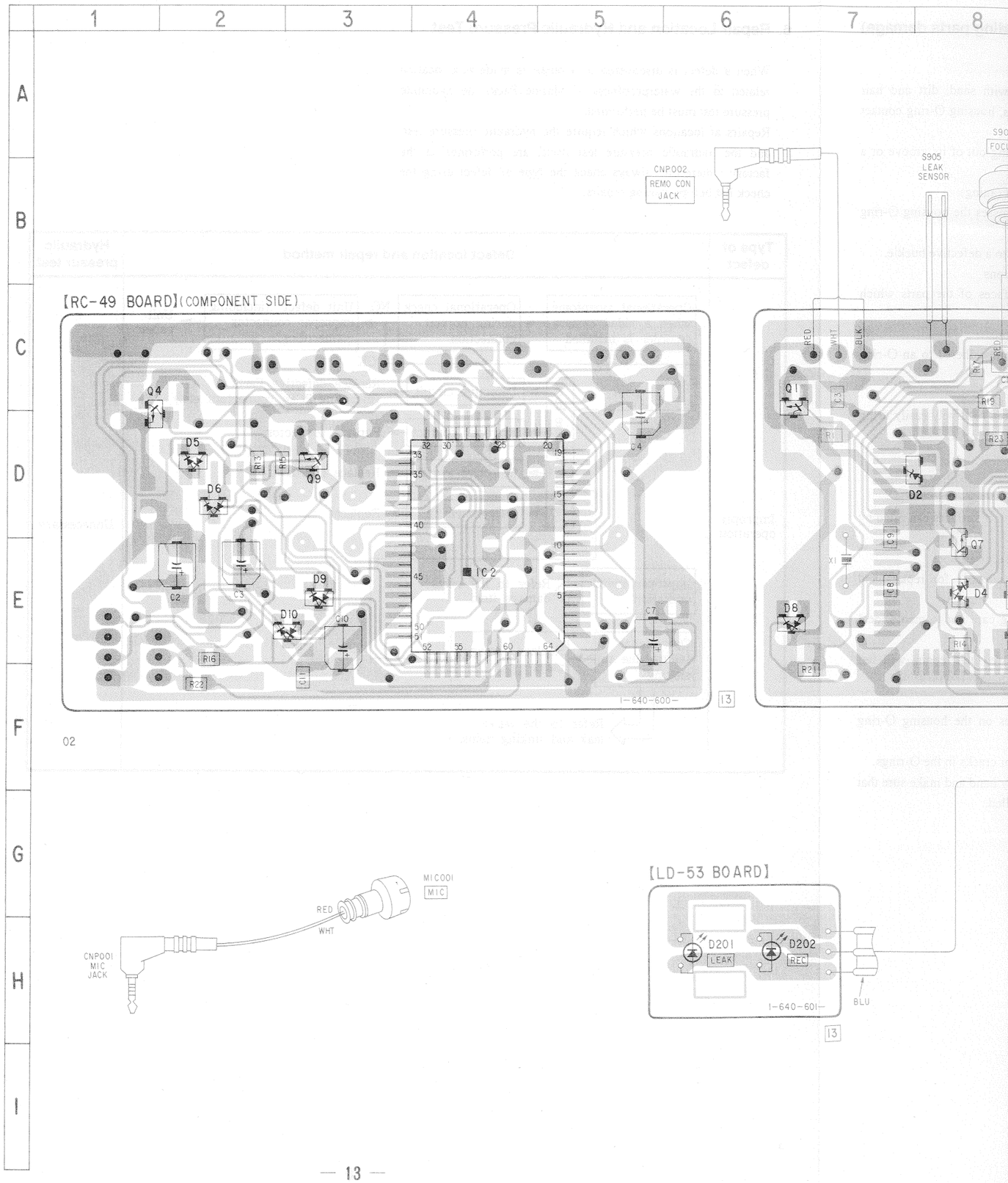
For printed wiring boards :

- ○—— : indicates a lead wire mounted on the componet side.
- ● : Through hole..
- ▭ : Pattern from the side which enables seeing.
- ▭ : Pattern of the rear side.

• SEMICONDUTOR LOCATION

CN1	C-8
CN2	C-9
CN3	C-9
CN4	C-10
D1	C-10
D2	D-7
D3	C-11
D4	E-8
D5	D-2
D6	D-2
D7	E-8
D8	E-7
D9	E-3
D10	E-3
D201	H-6
D202	H-6
IC1	D-10
IC2	E-4
IC101	I-12
Q1	C-7
Q2	E-10
Q3	E-10
Q4	C-1
Q5	D-9
Q6	E-8
Q7	E-8
Q8	D-9
Q9	D-3

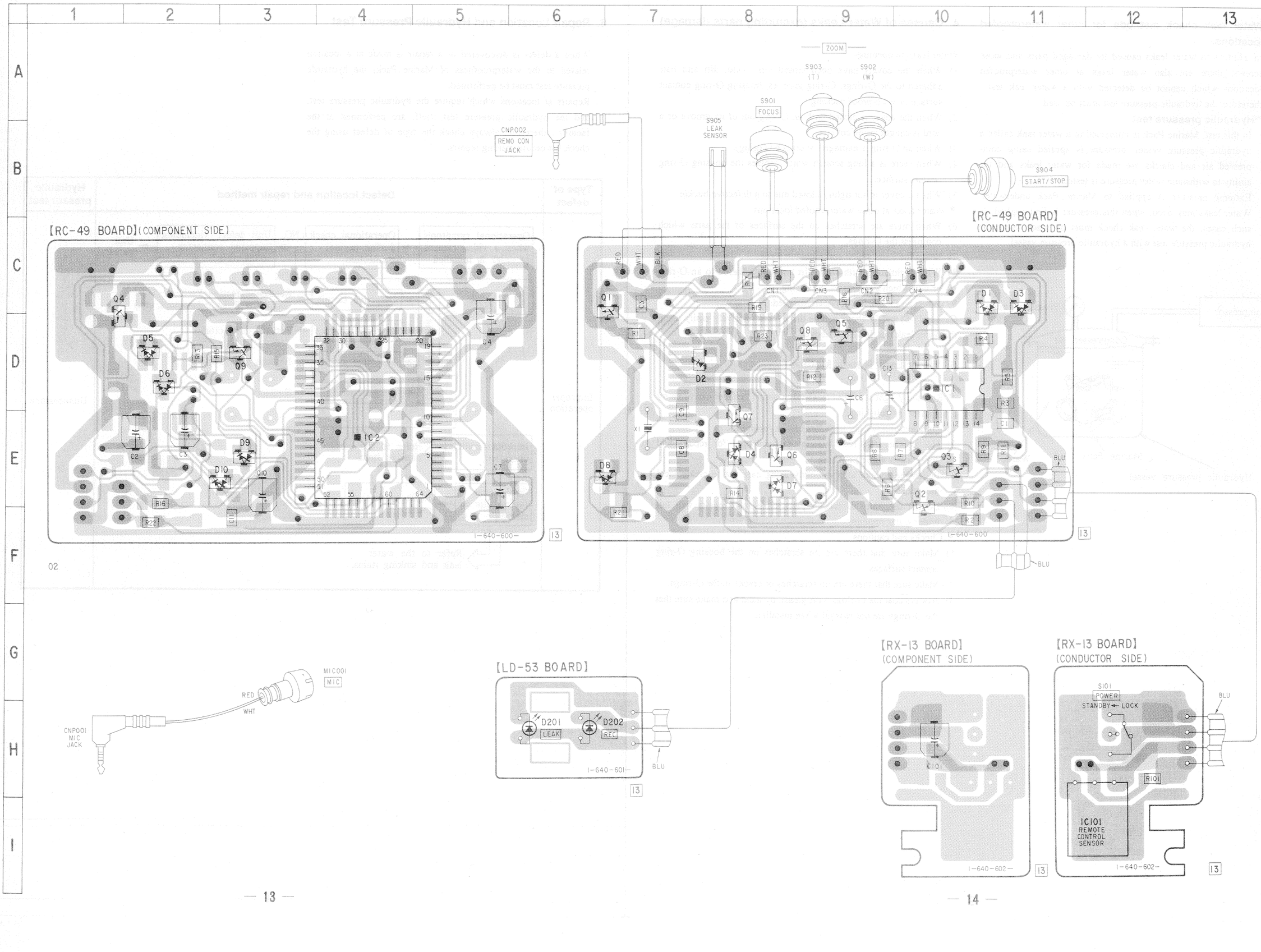
2-2. PRINTED WIRING BOARDS



M

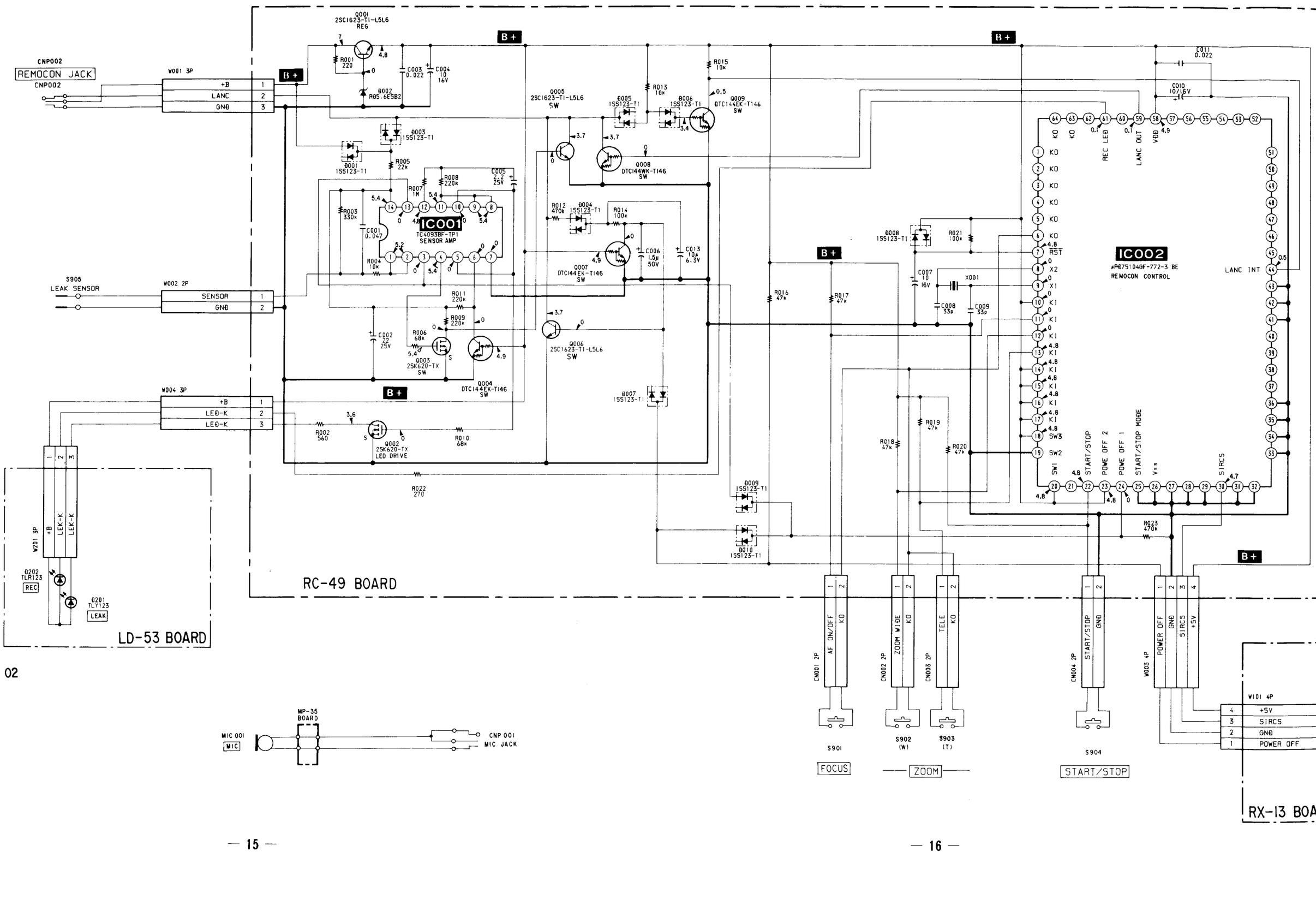
• SEMICONDUTOR LOCATION

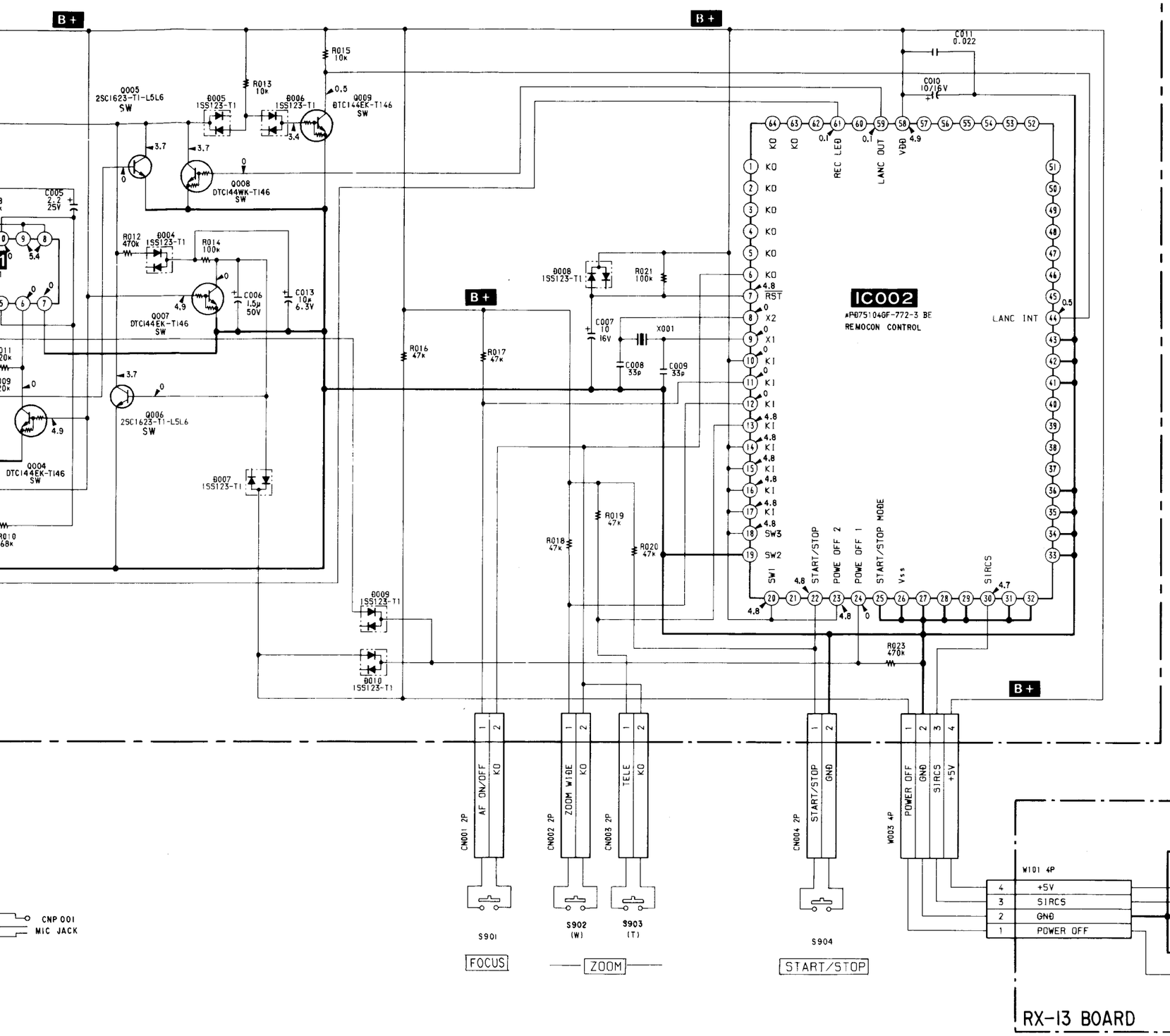
CN1	C-8
CN2	C-9
CN3	C-9
CN4	C-10
D1	C-10
D2	D-7
D3	C-11
D4	E-8
D5	D-2
D6	D-2
D7	E-8
D8	E-7
D9	E-3
D10	E-3
D201	H-6
D202	H-6
IC1	D-10
IC2	E-4
IC101	I-12
Q1	C-7
Q2	E-10
Q3	E-10
Q4	C-1
Q5	D-9
Q6	E-8
Q7	E-8
Q8	D-9
Q9	D-3

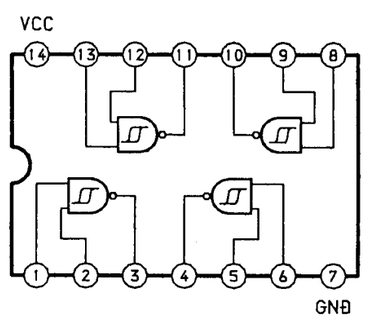


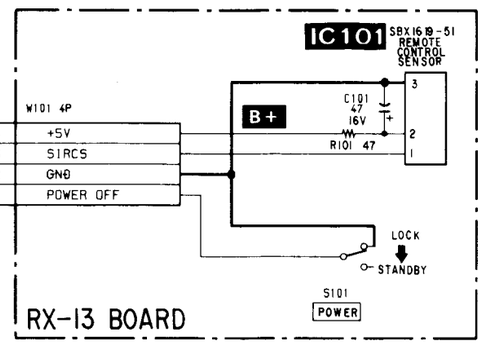
he componet side.

s seeing.


Q001 2SC1623-T1-L5L6 REG
CNP002 REMOCON JACK
W001 3P +B LANC GND
B+
R001 220
D002 RD5.6ESB2
C003 0.022
C004 10 16V
D003 1SS123-T1
D001 1SS123-T1
R005 22k
R007 1M
R008 220k
C005 2.2 25V
R003 330k
C001 0.047
R004 10k
IC001 TC4093BF-TP1 SENSOR AMP
S905 LEAK SENSOR
W002 2P SENSOR GND
R011 220k
R009 220k
R006 68k
Q003 2SK620-TX SW
C002 22 25V
Q004 DTC144EK-T146 SW
W004 3P +B LED-K LED-K
R002 560
Q002 2SK620-TX LED DRIVE
R010 68k
R022 270
W201 3P +B LEK-K LEK-K
D202 TLR123 REC
D201 TLY123 LEAK
LD-53 BOARD
RC-49 BOARD
02
Q005 2SC1623-T1-L5L6 SW
D005 1SS123-T1
D006 1SS123-T1
R013 10k
R015 10k
Q009 DTC144EK-T146 SW
Q008 DTC144WK-T146 SW
R012 470k
D004 1SS123-T1
R014 100k
Q007 DTC144EK-T146 SW
C006 1.5µ 50V
C013 10µ 6.3V
Q006 2SC1623-T1-L5L6 SW
D007 1SS123-T1
D009 1SS123-T1
D010 1SS123-T1
R016 47k
R017 47k
R018 47k
R019 47k
R020 47k
R021 100k
D008 1SS123-T1
C007 10 16V
X001
C008 33p
C009 33p
C011 0.022
C010 10/16V
IC002 µPD75104GF-772-3 BE REMOCON CONTROL
KO REC LED LANC OUT VDD RST X2 X1 K1 SW3 SW2 SW1 START/STOP POWE OFF 2 POWE OFF 1 START/STOP MODE Vss SIRCS LANC INT
R023 470k
CN001 2P AF ON/OFF KO
CN002 2P ZOOM WIDE KO
CN003 2P TELE KO
CN004 2P START/STOP GND
W003 4P POWER OFF GND SIRCS +5V
S901 FOCUS
S902 (W) S903 (T) ZOOM
S904 START/STOP
W101 4P +5V SIRCS GND POWER OFF
RX-13 BOA
MP-35 BOARD
MIC 001 MIC
CNP 001 MIC JACK







For schematic diagram :

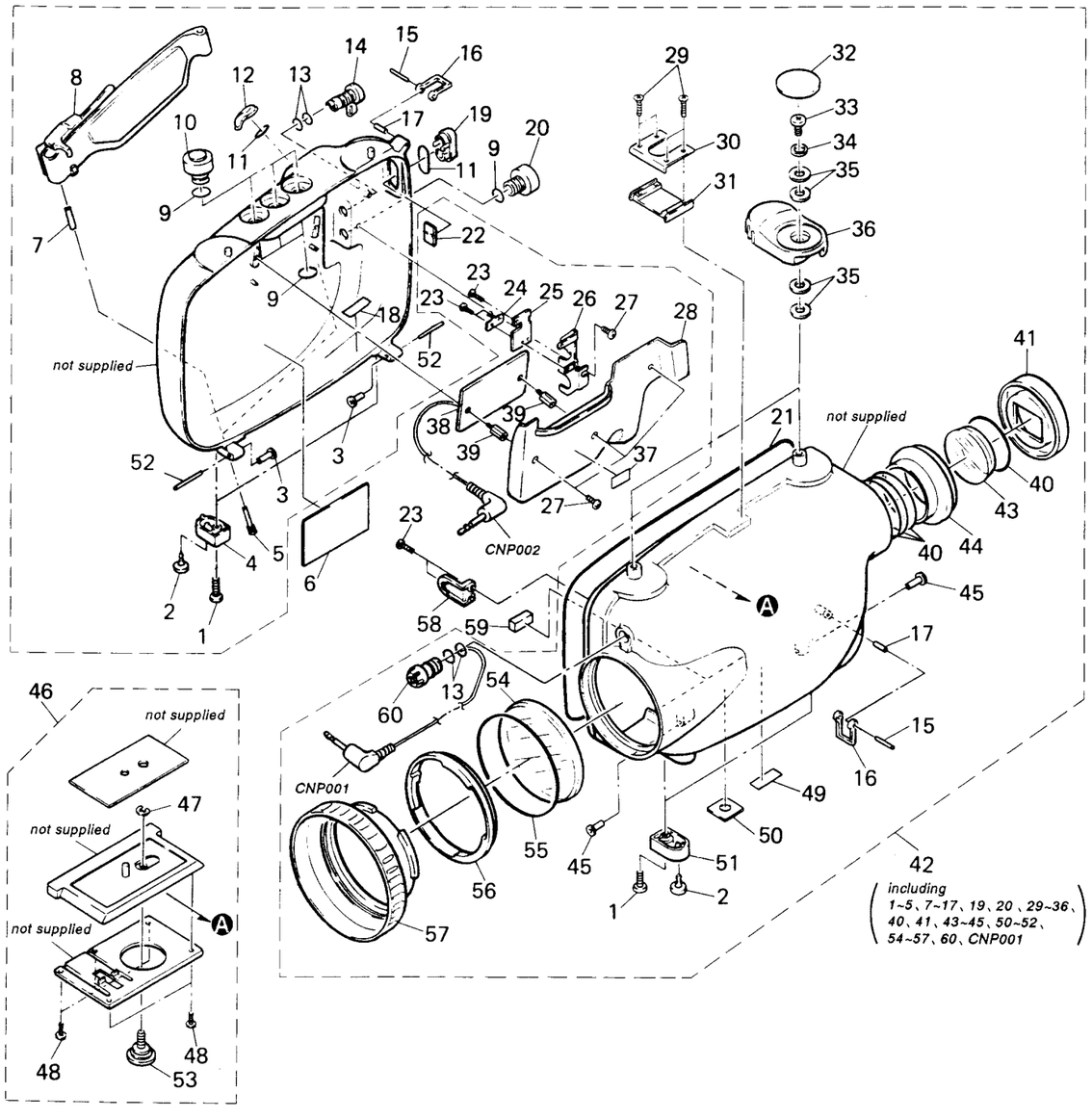
- Caution when replacing chip parts.
  New parts must be attached after removal of chip.
  Be careful not to heat the minuts side of tantalum capacitor, because it is damaged by the heat.
- All resistors are in ohms, chip resistors are ¼W unless otherwise noted. k Ω : 1000 Ω, M Ω : 1000k Ω.
- All capacitors are in μ F unless otherwise noted. pF : μ μ F. 50V or less are not indicated except for electrolytics and tantalums.
- **B+** : B + line.
- Voltages are taken with a VOM (Input impedance 10M Ω). Voltage variations may be noted due to normal production tolerances.

IC001 TC4093BF-TP1

SECTION 3
EXPLODED VIEWS

NOTE:
- -XX, -X mean standardized parts, so they may have some differences from the original one.
- The construction parts of an assembled part are indicated with a collation number in the remark column.
- Items marked "*" are not stocked since they are seldom required for routine service. Some delay should be anticipated when ordering these items.
- The mechanical parts with no reference number in the exploded views are not supplied.

3-1. MAIN SECTION (MPK-TRS)



Ref.No.	Part No.	Description	Remark
1	3-944-969-01	SCREW, FOOT FITTING	
2	3-945-041-01	FOOT, RUBBER	
3	3-944-972-01	BUSHING (R), HINGE	
4	3-944-970-01	FOOT (R), PLASTIC	
5	3-945-052-01	SHAFT, FITTING	
6	3-944-942-01	LABEL, CONTROL PROCEDURE	
7	3-945-053-01	BUSHING, SHAFT	
8	3-941-464-11	BELT, GRIP	
9 /	3-945-074-01	RING, O	
10	X-3491-574-1	BUTON SWITCH (G) ASSY	
11	3-945-046-01	RING, O	
12 /	3-945-047-01	WINDOW, REMOTE CONTROL	
13 /	3-945-050-01	RING, O	
14 /	3-945-049-01	LEVER, STAND-BY	
15	3-945-043-01	PIN, HOOK	
16	3-945-042-01	HOOK, SHOULDER BELT	
17	3-945-044-01	BUSHING, HOOK	
* 18	3-947-383-01	CAUTION LABEL (A) ,REEK SENSOR	
19 /	3-945-045-01	WINDOW, LED	
20	X-3941-077-1	BUTTON ASSY, REC	
21	3-945-025-01	RING, O	
22	A-6766-394-A	LD-53 BOARD, COMPLETE	
23	3-946-348-01	SCREW, MICROPHONE COVER	
24 /	3-944-947-01	CLIP SPRING	
25	A-6766-395-A	RX-13 BOARD, COMPLETE	
* 26	3-944-948-01	BRACKET, PCB	
27	3-945-056-01	SCREW, COVER, PC BOARD FITTING	
28	3-945-054-01	COVER, PC BOARD	
29	3-945-082-01	SCREW (2X8), +K	
30	3-945-080-01	SHOE, ACCESSORY	
31	3-945-083-01	PLATE, SHOE, ACCESSORY	

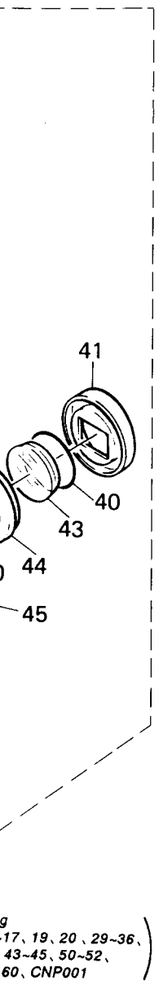
The parts with / mark are waterproof parts.
Make sure to use genuine parts only.
After replacing the parts, perform test for waterproofness.

Ref.No.	Part No.	Description	Remark
32 /	3-945-064-01	COVER, BUCKLE	
33 /	3-945-063-01	SCREW, BUCKLE	
34	3-945-081-01	WASHER, BUCKLE	
35	3-946-840-01	WASHER, TEFLON	
36 /	3-945-062-01	BUCKLE	
* 37	3-944-941-01	LABEL, MODEL NUMBER	
38	A-6766-393-A	RC-49 BOARD, COMPLETE	
39	3-945-057-01	SCREW, PC BOARD	
40 /	3-945-069-01	RING, O	
41	3-945-072-01	EYE CUP	
* 42 /	A-6768-685-A	HOUSING ASSY	
43 /	3-945-070-01	GLASS, WINDOW	
44 /	3-945-071-01	BODY, WINDOW	
45	3-945-078-01	BUSHING (L), HOOK	
46	A-6768-649-A	BASE BLOCK ASSY	
47	2-391-512-00	RING (5), RETAINING, E TYPE	
48	3-940-462-01	SCREW, TP 2 PAN PRECISION	
49	3-703-034-11	LABEL, CAUTION	
50	3-946-839-01	PAD, TRIPOD	
51	3-945-077-01	FOOT (L), PLASTIC	
52	3-944-940-01	PIN, HINGE	
53	3-749-199-01	SCREW, CAMERA FITTING	
54 /	3-945-066-01	GLASS, FRONT	
55 /	3-945-065-01	RING, O	
56 /	3-945-067-01	RETAINER, FRONT WINDOW	
57	3-945-068-01	HOOD	
58	3-945-038-01	COVER, MICROPHONE	
59	3-947-202-01	CUSHION	
60	X-3941-086-1	MICROPHONE ASSY	
CNP001	1-690-924-11	CORD, CONNECTION	
CNP002	1-574-052-11	CORD, CONNECTION	

3-2. GRIP SECTION

Ref.No.	Part No.
101	3-944-955-
102	3-946-621-
103	3-945-010-
104	3-944-944-
105	3-945-020-
106	X-3941-067
107	2-115-929-
108	3-944-943-
109	3-946-347-
110	2-115-929-
111	X-3941-338
112	3-945-019-
113	3-944-953-

Ref.No.	Part No.	Description	Remark
1	3-944-969-01	SCREW, FOOT FITTING	
2	3-945-041-01	FOOT, RUBBER	
3	3-944-972-01	BUSHING (R), HINGE	
4	3-944-970-01	FOOT (R), PLASTIC	
5	3-945-052-01	SHAFT, FITTING	
6	3-944-942-01	LABEL, CONTROL PROCEDURE	
7	3-945-053-01	BUSHING, SHAFT	
8	3-941-464-11	BELT, GRIP	
9	/ 3-945-074-01	RING, O	
10	X-3491-574-1	BUTON SWITCH (G) ASSY	
11	3-945-046-01	RING, O	
12	/ 3-945-047-01	WINDOW, REMOTE CONTROL	
13	/ 3-945-050-01	RING, O	
14	/ 3-945-049-01	LEVER, STAND-BY	
15	3-945-043-01	PIN, HOOK	
16	3-945-042-01	HOOK, SHOULDER BELT	
17	3-945-044-01	BUSHING, HOOK	
* 18	3-947-383-01	CAUTION LABEL (A) , REEK SENSOR	
19	/ 3-945-045-01	WINDOW, LED	
20	X-3941-077-1	BUTTON ASSY, REC	
21	3-945-025-01	RING, O	
22	A-6766-394-A	LD-53 BOARD, COMPLETE	
23	3-946-348-01	SCREW, MICROPHONE COVER	
24	/ 3-944-947-01	CLIP SPRING	
25	A-6766-395-A	RX-13 BOARD, COMPLETE	
* 26	3-944-948-01	BRACKET, PCB	
27	3-945-056-01	SCREW, COVER, PC BOARD FITTING	
28	3-945-054-01	COVER, PC BOARD	
29	3-945-082-01	SCREW (2X8), +K	
30	3-945-080-01	SHOE, ACCESSORY	
31	3-945-083-01	PLATE, SHOE, ACCESSORY	

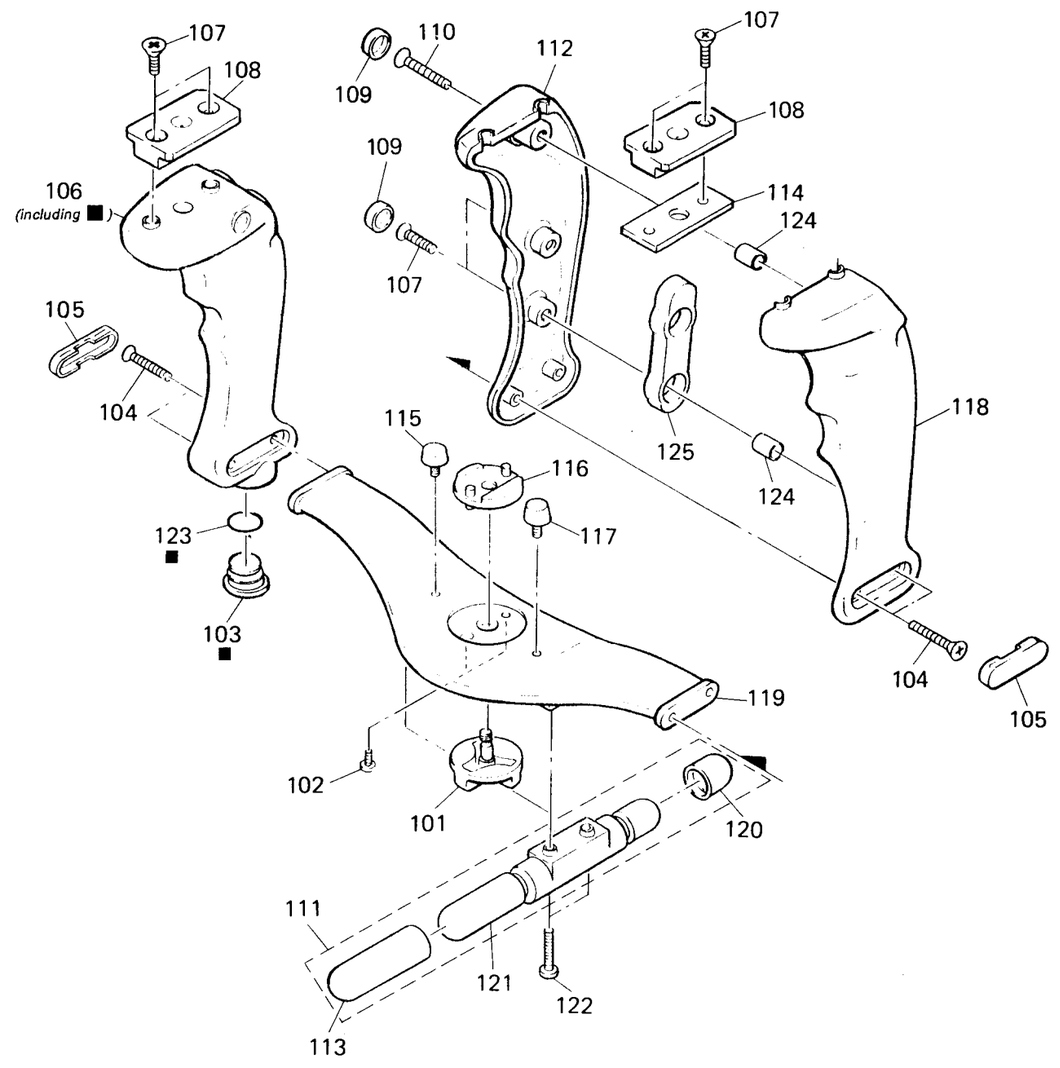


g
-17、19、20、29~36、
43~45、50~52、
60、CNP001

Ref.No.	Part No.	Description	Remark
32	/ 3-945-064-01	COVER, BUCKLE	
33	/ 3-945-063-01	SCREW, BUCKLE	
34	3-945-081-01	WASHER, BUCKLE	
35	3-946-840-01	WASHER, TEFLON	
36	/ 3-945-062-01	BUCKLE	
* 37	3-944-941-01	LABEL, MODEL NUMBER	
38	A-6766-393-A	RC-49 BOARD, COMPLETE	
39	3-945-057-01	SCREW, PC BOARD	
40	/ 3-945-069-01	RING, O	
41	3-945-072-01	EYE CUP	
* 42	/ A-6768-685-A	HOUSING ASSY	
43	/ 3-945-070-01	GLASS, WINDOW	
44	/ 3-945-071-01	BODY, WINDOW	
45	3-945-078-01	BUSHING (L), HOOK	
46	A-6768-649-A	BASE BLOCK ASSY	
47	2-391-512-00	RING (5), RETAINING, E TYPE	
48	3-940-462-01	SCREW, TP 2 PAN PRECISION	
49	3-703-034-11	LABEL, CAUTION	
50	3-946-839-01	PAD, TRIPOD	
51	3-945-077-01	FOOT (L), PLASTIC	
52	3-944-940-01	PIN, HINGE	
53	3-749-199-01	SCREW, CAMERA FITTING	
54	/ 3-945-066-01	GLASS, FRONT	
55	/ 3-945-065-01	RING, O	
56	/ 3-945-067-01	RETAINER, FRONT WINDOW	
57	3-945-068-01	HOOD	
58	3-945-038-01	COVER, MICROPHONE	
59	3-947-202-01	CUSHION	
60	X-3941-086-1	MICROPHONE ASSY	
CNP001	1-690-924-11	CORD, CONNECTION	
CNP002	1-574-052-11	CORD, CONNECTION	

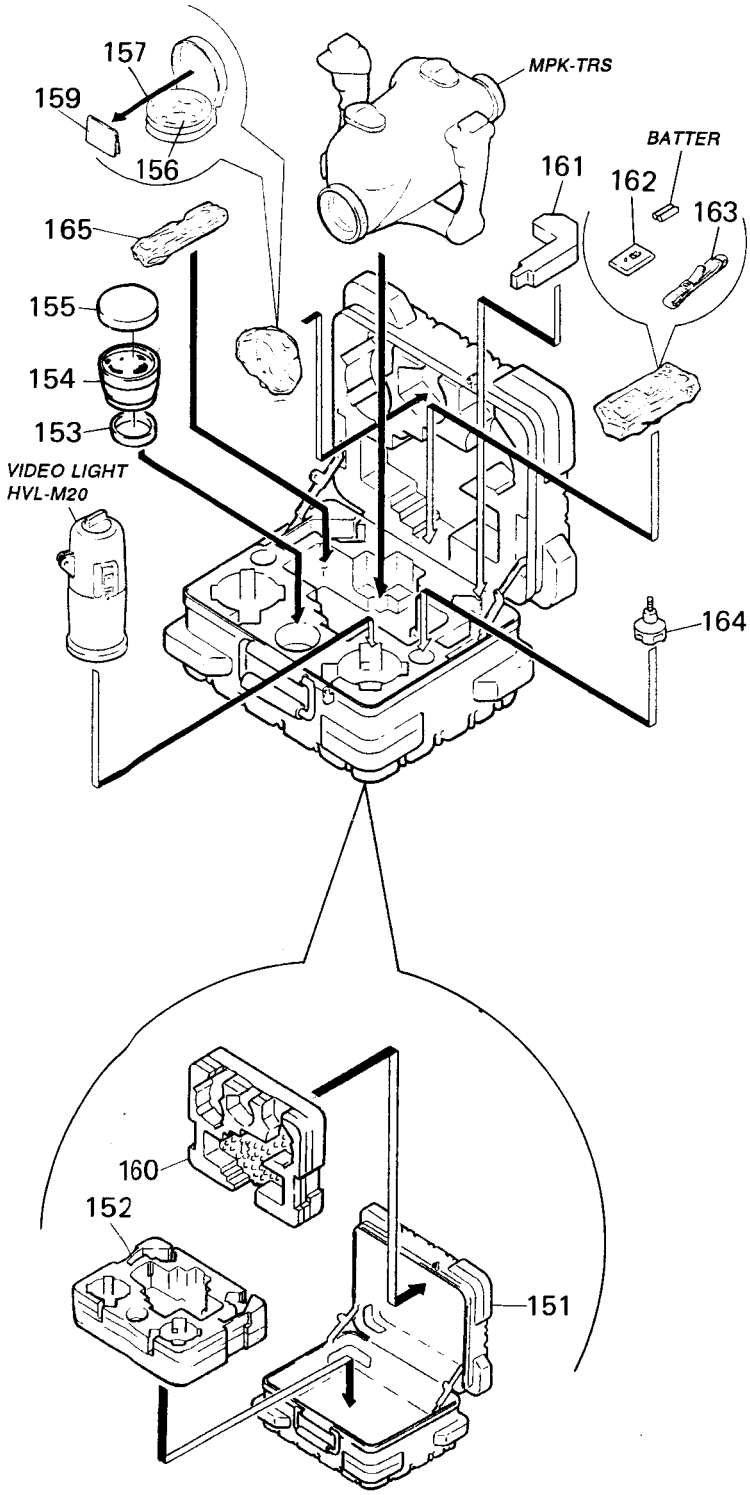
The parts with / mark are waterproof parts.
Make sure to use genuine parts only.
After replacing the parts, perform test for waterproofness.

3-2. GRIP SECTION (MPK-TRS)



Ref.No.	Part No.	Description	Remark
101	3-944-955-01	SCREW, FITTING	
102	3-946-621-01	SCREW (M3.5X8)	
103	3-945-010-01	LID, BATTERY CHANGE	
104	3-944-944-01	SCREW (5X16), +K	
105	3-945-020-01	COVER, GRIP	
106	X-3941-067-1	GRIP (R) ASSY	
107	2-115-929-11	+K 5X18	
108	3-944-943-01	SHOE, ACCESSORY	
109	3-946-347-01	COVER, GRIP 2	
110	2-115-929-21	+K 5X30	
111	X-3941-338-1	TORPEDO SUB ASSY	
112	3-945-019-01	GRIP (L P)	
113	3-944-953-01	BUMPER, FRONT	
114	3-945-011-01	BRACKET, ACCESSORY SHOE	
115	2-181-680-01	CUSHION, SCREW A	
116	3-944-959-01	INSERT, SADDLE	
117	3-947-385-01	CUSHION, SCREW C	
118	3-945-013-01	GRIP (L D)	
119	3-944-945-01	KEEL	
120	3-944-954-01	BUMPER, REAR	
121	3-944-957-01	ROD, LEAD	
122	3-944-958-01	+B 4X25	
123	3-945-087-01	RING, O	
124	2-115-909-21	INSERT	
125	2-115-913-01	GRIP WEIGHT	

3-3. PACKING SECTION (MPK-TRH)



Ref.No.	Part No.	Description	Remark
* 151	3-944-965-01	CASE, CARRYING (LCH-M10)	
152	3-945-482-01	CUSHION (LOWER) (AEP)	
153	3-945-024-01	CAP, REAR (AEP)	
154	3-945-022-01	LENS, WIDE CONVERSION (VCL-TRS) (AEP)	
155	3-945-023-01	CAP, FRONT (AEP)	
156	3-944-968-01	FILTER, COLOR (VF-M90) (AEP)	
157	3-946-838-01	STRAP (AEP)	
158	3-945-025-01	RING, O (US, Candian, AEP)	
159	3-753-987-01	MANUAL, INSTRUCTION (VF-M90) (AEP)	
160	3-945-481-01	CUSHION (UPPER) (AEP)	
161	3-944-993-01	ARM LIGHT	
162	A-6768-649-A	BASE BLOK ASSY	
163	3-941-465-01	BELT, STRAP	
164	A-6767-185-A	KNOB, FASTEN ASSY	
165	3-944-967-01	BELT, SHOULDER (AEP)	

MPK-TRH/TRS

LD-53 **RC-49**

SECTION 4
ELECTRICAL PARTS LIST

NOTE:
- Due to standardization, replacements in the parts list may be different from the parts specified in the diagrams or the components used on the set.
- -XX, -X mean standardized parts, so they may have some difference from the original one.
- RESISTORS
  All resistors are in ohms
  METAL: Metal-film resistor
  METAL OXIDE: Metal oxide-film resistor
  F: nonflammable
- Items marked "*" are not stocked since they are seldom required for routine service. Some delay should be anticipated when ordering these items.
- SEMICONDUCTORS
  In each case, u: μ, for example:
  uA....: μA...., uPA....: μPA....
  uPB....: μPB...., uPC....: μPC....
  uPD....: μPD....
- CAPACITORS
  uF: μF
- COILS
  uH: μH

When indicating parts by reference number, please include the board.

Ref.No.	Part No.	Description			Remark
	A-6766-394-A	LD-53 BOARD, COMPLETE			
		**********			
		< DIODE >			
D201	8-719-812-32	LED TLY123 (LEAK)			
D202	8-719-812-31	LED TLR123 (REC)			
**********					
	A-6766-393-A	RC-49 BOARD, COMPLETE			
		**********			
	1-566-757-11	PIN, CONNECTOR (PC BOARD) 2P			
	1-690-457-11	WIRE (LEAK SENSOR)			
		< CAPACITOR >			
C001	1-163-035-00	CERAMIC CHIP	0.047uF		50V
C002	1-128-158-11	ELECT	22uF	20%	25V
C003	1-163-033-00	CERAMIC CHIP	0.022uF		50V
C004	1-128-155-11	ELECT	10uF	20%	16V
C005	1-128-162-21	ELECT	2.2uF	20%	25V
C006	1-126-157-11	ELECT	10uF	20%	16V
C007	1-128-155-11	ELECT	10uF	20%	16V
C008	1-163-105-00	CERAMIC CHIP	33PF	5%	50V
C009	1-163-105-00	CERAMIC CHIP	33PF	5%	50V
C010	1-128-155-11	ELECT	10uF	20%	16V
C011	1-163-033-00	CERAMIC CHIP	0.022uF		50V
C013	1-126-157-11	ELECT	10uF	20%	16V
		< CONNECTOR >			
CNP002	1-574-052-11	CORD, CONNECTION			

Ref.No.	Part No.	Description			Remark
		< DIODE >			
D001	8-719-800-76	DIODE 1SS226			
D002	8-719-105-91	DIODE RD5.6M-B2			
D003	8-719-800-76	DIODE 1SS226			
D004	8-719-800-76	DIODE 1SS226			
D005	8-719-800-76	DIODE 1SS226			
D006	8-719-800-76	DIODE 1SS226			
D007	8-719-800-76	DIODE 1SS226			
D008	8-719-800-76	DIODE 1SS226			
D009	8-719-800-76	DIODE 1SS226			
D010	8-719-800-76	DIODE 1SS226			
		< IC >			
IC001	8-759-200-85	IC TC4093BF			
IC002	8-759-518-88	IC uPD75104GF-772-3BE			
		< TRANSISTOR >			
Q001	8-729-100-66	TRANSISTOR 2SC1623			
Q002	8-729-421-71	TRANSISTOR 2SK620			
Q003	8-729-421-71	TRANSISTOR 2SK620			
Q004	8-729-901-01	TRANSISTOR DTC144EK			
Q005	8-729-100-66	TRANSISTOR 2SC1623			
Q006	8-729-100-66	TRANSISTOR 2SC1623			
Q007	8-729-901-01	TRANSISTOR DTC144EK			
Q008	8-729-901-03	TRANSISTOR DTC144WK			
Q009	8-729-901-01	TRANSISTOR DTC144EK			
		< RESISTOR >			
R001	1-216-033-00	METAL CHIP	220	5%	1/10W
R002	1-216-043-00	METAL CHIP	560	5%	1/10W
R003	1-216-109-00	METAL CHIP	330K	5%	1/10W
R004	1-216-073-00	METAL CHIP	10K	5%	1/10W
R005	1-216-081-00	METAL CHIP	22K	5%	1/10W

Ref.No.	Part No.	Description			Remark
R006	1-216-093-00	METAL CHIP	68K	5%	1/10W
R007	1-216-121-00	METAL CHIP	1M	5%	1/10W
R008	1-216-105-00	METAL CHIP	220K	5%	1/10W
R009	1-216-105-00	METAL CHIP	220K	5%	1/10W
R010	1-216-093-00	METAL CHIP	68K	5%	1/10W
R011	1-216-105-00	METAL CHIP	220K	5%	1/10W
R012	1-216-097-00	METAL CHIP	100K	5%	1/10W
R013	1-216-073-00	METAL CHIP	10K	5%	1/10W
R014	1-216-097-00	METAL CHIP	100K	5%	1/10W
R015	1-216-073-00	METAL CHIP	10K	5%	1/10W
R016	1-216-089-00	METAL CHIP	47K	5%	1/10W
R017	1-216-089-00	METAL CHIP	47K	5%	1/10W
R018	1-216-089-00	METAL CHIP	47K	5%	1/10W
R019	1-216-089-00	METAL CHIP	47K	5%	1/10W
R020	1-216-089-00	METAL CHIP	47K	5%	1/10W
R021	1-216-097-00	METAL CHIP	100K	5%	1/10W
R022	1-216-035-00	METAL CHIP	270	5%	1/10W
R023	1-216-113-00	METAL CHIP	470K	5%	1/10W
		< CRYSTAL >			
X001	1-567-192-11	OSCILLATOR, CERAMIC	4.00MHz		

****

	A-6766-395-A	RX-13 BOARD, COMPLETE			
		**********			
	1-690-451-11	CORD, POWER (WITH COIL)			
		< CAPACITOR >			
C101	1-126-204-11	ELECT CHIP	47uF	20%	16V
		< IC >			
IC101	8-741-100-63	IC SBX1619-51			
		< RESISTOR >			
R101	1-216-017-00	METAL CHIP	47	5%	1/10W
		< SWITCH >			
S001	1-692-035-11	SWITCH, MICRO (POWER)			

****

		MISCELLANEOUS
		**********
CNP001	1-690-924-11	CORD, CONNECTION
CNP002	1-574-052-11	CORD, CONNECTION

Ref.No.	Part No.	Description	Remark
		ACCESSORIES & PACKING MATERIALS **(MPK-TRS)**	
		**********	
	X-3941-072-1	LENS ASSY, WIDE CONVERSION(VCK-TRS)(AEP)	
	3-945-023-01	CAP, FRONT (AEP)	
	3-944-968-01	FILTER, COLOR(VF-M90) (AEP)	
	2-115-921-01	GREASE (US, Canadian, AEP)	
	3-753-757-12	MANUAL, INSTRUCTION (AEP) (ENGLISH, FRENCH, POLTUGUESE)	
	3-753-757-22	MANUAL, INSTRUCTION (US, Canadian) (ENGLISH, FRENCH, POLTUGUESE)	
	3-753-757-42	MANUAL, INSTRUCTION (AEP) (GERMAN, DUTCH, SWEDISH, ITALIAN, ARABIC)	
	3-753-757-52	MANUAL, INSTRUCTIN (AEP)(CHINESE)	
	3-753-987-01	MANUAL, INSTRUCTION(VF-M90) (AEP)	
*	3-944-224-01	INDIVIDUAL CARTON (US, Candian, AEP)	
*	3-945-477-01	CUSHION (UPPER) (US, Canadian, AEP)	
*	3-945-478-02	CUSHION (LOWER) (US, Canadian, AEP)	
	3-946-838-01	STRAP (AEP)	

****

		ACCESSORIES & PACKING MATERIALS **(MPK-TRH)**	
		**********	
*	3-944-962-01	INDIVIDUAL CARTON (AEP)	
*	3-945-195-01	CUSHION CORNER (4 PIECE)(AEP)	
	2-115-921-01	GREASE (AEP)	
	3-753-856-11	MANUAL, INSTRUCTION (HVL-M20)(AEP)	
	3-753-856-41	MANUAL, INSTRUCTION (HVL-M20)(AEP)	
	3-945-040-01	RING (G85), O (AEP)	
	3-753-757-12	MANUAL, INSTRUCTION (MPK-TRS) (ENGLISH, FRENCH, SPANISH)(AEP)	
	3-753-757-22	MANUAL, INSTRUCTION (MPK-TRS) (ENGLISH, FRENCH, SPANISH)(US, Canadian)	
	3-753-757-42	MANUAL, INSTRUCTION (MPK-TRS) (GERMAN, DUTCH, SWEDISH, ITALIAN, ARABIC)(AEP)	
	3-753-986-11	MANUAL, INSTRUCTION (LCH-M10)(AEP)	

When indicating parts by reference number, please include the board.

9-973-165-11

Sony Corporation
Personal Video Group

English
92B0277-1
Printed in Japan
©1992.2
Published by Customer Relations and Service Group